Model Trenching/Excavation Policy and Procedures for Municipal Public Works Departments in Massachusetts

(Employer/Town Department) has established this written policy in order to standardize procedures for all trenching and excavation operations so that employees are protected from injuries.

All employees, supervisors and managers are required to follow this policy. Failure to comply with this policy will result in disciplinary action and possible termination. If there are any questions about this policy, contact *(Commissioner/Superintendent/Program Manager)* .

A copy of this policy and procedure will be kept at each trench site along with the Daily Worksite Checklist for employee review.

Designation of Authority

(Commissioner/Superintendent/Program Manager) is ultimately responsible for Trenching/Excavation Safety in this Department. However, for the purpose of daily operations, this responsibility is delegated to the following individuals within the Department. The chain of authority for the trenching/excavation program follows:

(Commissioner/Superintendent/Program Manager)

⇩

(Other designated authority level(s))

⇩

(Competent Person)

⇩

(Supervisor/Foreman)

*Note-Although the OSHA Standard does not require the competent person to be on site at all times, analyses have shown that the vast majority (in some cases 9 out of 10) of trenching fatalities occur when the competent person was **NOT** on site. It is therefore recommended that municipalities **REQUIRE** that the competent person remain on site at all times.*

Program Manager

(Commissioner/Superintendent/Program Manager) has been designated as the trenching program manager. He/she is ultimately responsible for insuring that the procedures set forth in this policy are followed by all members of this Department (managers, supervisors and employees). The (*Program Manager*) is responsible for assigning a competent person to every trench/excavation-site. The (*Program Manager*) will also meet with all employees to review the trenching/excavation policy and procedures annually and will make any modifications as needed. In addition, if any near misses or accidents occur, the program manager will immediately review the program to determine if procedures were followed and to determine if any changes in procedures are needed to prevent future incidents.

The (*Program Manager*) may delegate daily responsibilities for program operation as set forth in the chain of command below.

Other Designated Levels of Authority

(Assign responsibilities as appropriate. If there is a level of authority between the program manager and competent person, this individual should be assigned the responsibility for assigning a competent person to each trenching/excavation-site. This individual(s) should also be the person the competent person reports to).

Competent Person(s)

The OSHA Trenching Standard requires the designation of a "competent person". This individual is someone who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous or dangerous to employees. This individual is trained to identify soil classifications* and protective systems and is knowledgeable and trained in the OSHA Trenching Standards. This individual will also be competent to use air monitoring equipment to determine acceptable entry conditions, and know how to use ventilation to control hazardous atmospheres.

(*Note-In lieu of soil classification expertise the competent person will assume that all soil is Type C).

This individual is furthermore AUTHORIZED by *(Program Manager)* to take prompt corrective measures to eliminate them. The following individuals have been designated as a competent person and are considered to have this level of competency and authority.

(Names and Titles of Competent Persons)

_____

_____

_____

The Program Manager or designee will assign a competent person to every trenching/excavation-site.

The competent person will pre-plan all work using the Pre-Job checklist. This individual will be on-site at least initially and thereafter at least daily to fill out the Daily Worksite Checklist in order to ensure that the proper protective systems and equipment are in place.

The competent person will provide all employees on-site with a daily briefing if there are any unusual hazards or special work practices at the particular worksite. The Daily Worksite Checklist will be left on site for employees to review.

While the competent person does not need to be on-site at all times, he/she will as a minimum perform a daily inspection and will reinspect the site after any rainstorms or any other situations that arise to ensure that conditions have not changed and that proper procedures continue to be followed. If at any time the competent person feels there is a hazardous condition, this individual will be responsible for removing employees from the trench/excavation until the hazard has been corrected. If the competent person is not on-site, he/she must delegate authority to the (*on-site supervisor)*.

Foreman/On-Site Supervisor

Every worksite must have a foreman/supervisor present for all trenching/excavation work. If the competent person leaves the worksite, the on-site foreman/supervisor becomes responsible for assuring that safety procedures established on the Daily Worksite Checklist are being followed. If safety issues arise the foreman/on-site supervisor is responsible for removing employees from the danger and immediately contacting the competent person for a re-evaluation.

Employee Responsibilities

Employees are required to follow all safety procedures established by the competent person. They are also responsible for making management aware of any safety concerns or near misses. Should any safety concerns arise, employees are expected to exit the site and immediately notify either the on-site supervisor or competent person. **Employees are NOT to work or allow others to work in a situation that they feel is unsafe.**

If there is any dispute or concern that is not adequately addressed by the on-site supervisor or competent person, the employee is expected to follow the chain of command and make management aware of any unresolved safety issues.

Registered Professional Engineer

A Registered Professional Engineer is required for protective systems used when excavations are deeper than 20 ft. A Registered Professional Engineer is also required when the stability of adjoining structures such as walls or buildings may affect the excavation/trench.

Pre-Job Checklist

A Pre-Job Checklist will be filled out by the competent person at least 72 hours prior to work in non-emergency situations. This checklist will be available to employees at the worksite prior to all work.

Work around Utilities/Safety Zones

Prior to digging, the competent person responsible for the trenching/excavation will contact the appropriate authorities and reference documentation to determine the location of all utilities such as sewer, telephone, fiber, gas, electric and water lines. For non-emergency work, this should be done at least 72 hours in advance of work. Emergency work must be approved by the Program Manager and is generally defined as unplanned events that require immediate attention such as a water main break . All other work is considered “non-emergency”.

All utilities in the vicinity will be clearly marked with the standard color-coding used by DIGSAFE. If work is required near such utility lines, the competent person must ensure that the appropriate measures are taken to protect employees prior to the start of work.

When working around utilities, a safety zone will be established. Within this safety zone only non-mechanical means of digging will be allowed. As a minimum this zone will be marked by adding 18 inches PLUS half the width of the facility on EACH side of the utility. The competent person assigned to the site will ensure that the safety zone around these utilities is clearly marked.

Traffic Control

Employees exposed to public vehicular traffic are required to wear orange, yellow, yellow-green or fluorescent safety vests with retroreflective striping that meet the ANSI standard. Appropriate control devices such as jersey barriers or cones must be place around work area. All traffic control work should follow the Manual of Uniform Traffic Control Devices (MUTCD), Part 6.

Daily Worksite Checklist

A daily worksite checklist form has been developed to ensure that all routine safety issues are reviewed on each worksite. The competent person will fill out the daily checklist at every trenching/excavation-site on the day the work is being performed. If the work extends beyond one day, a new daily worksite checklist will be filled out by the competent person at the beginning of the work shift each day.

This checklist will be kept at the worksite the entire time employees are working at the trenching/excavation site so it can be reviewed if necessary. These checklists will be kept for a period of one year in the Program Manager’s office so they can be referenced when the program is reviewed on an annual basis.

Personal Protective Equipment

The competent person will make the determination on required personal protective equipment. Hardhats and work boots will be required on every trenching/excavation site as a minimum. In addition, the following PPE may be required:

- Safety vests
- Eye and Face Protection
- Hearing Protection
- Steel-Toed Safety Shoes

The competent person as well as the supervisor on-site will be responsible for insuring that the designated personal protective equipment specified on the daily worksite checklist is worn at all times.

Loose Rock and Soil/Spoil Pile Placement

Employees will be protected from loose rock or soil that could pose a hazard by falling or rolling from an excavation face by such measures as scaling, installation of barricades or other protective measures.

Spoil piles and heavy equipment must be set at least 2 feet back from the trenching/excavation. If the site does not permit such a set back, spoils need to be temporarily hauled to another location.

Soil Classification

The OSHA trenching standards require the identification of soil types in order to determine the types of protective systems needed. However, because most trenching/excavations in__*(Town/City)*_ will be conducted in order to replace existing lines or equipment, all trenching/excavation work conducted in this Department will be considered to have Type C soil-soil that has previously been disturbed and may have water present-and is therefore the most unstable. This presumes a “worst-case scenario” so that the most protective measures will be taken by default.

Support Methods for Trenching Operations

All trenches five feet or greater in depth (or at more shallow depths as decided by competent person) must have protection. It is the policy of our Department that the deepest part of the trench will be measured for purposes of determining if protection is needed.

One of the following protective systems must be used to protect employees within the trench.

1. Trench boxes (Shields)
2. Sloping or Benching to the angle of repose
3. Shoring (Timber or Aluminum Hydraulic)

Trench Boxes- will be used in the majority of trenching/excavation work done in this Department.

Sloping/Benching- can only be used in limited circumstances and will not routinely be used in our Department. All Sloping or benching systems should meet the requirements of Appendix B of OSHA Standards 1926 Subpart P. If the configurations allowed in Appendix B are not followed, then a Registered Professional Engineer must design the sloping or benching system. In our Department (registered PE/Consultant) will design and sign off on all sloping or benching systems. Plans for any protective system designed by a Registered Professional Engineer will remain on site during construction.

Shoring-Timber or Aluminum Hydraulic –will generally not be used by our Department. All aluminum hydraulic shoring will meet the requirements of Appendix A and D of OSHA Standards 1926 Subpart P or be used in accordance with manufacturer's instructions. All timber shoring will meet the requirements of Appendix A and C of OSHA Standards 1926 Subpart P or be used in accordance with manufacturer's instructions. If the appendixes or manufacturer's instructions are not followed, then shoring systems must be designed by a Registered Professional Engineer. In our Department *(engineer or consultant)* is the registered professional engineer who will design and sign off on all shoring systems. Plans for any protective system designed by a Registered Professional Engineer will remain on site during construction.

Trench boxes (Shields)

Most trenching/excavation work in this Department will be done using trench boxes. The trench boxes must extend to a level no greater than 2 feet of the bottom of the trench (as long as there is no loss of soil from behind or below the bottom of the support system) and must extend 18 inches above the vertical wall of the trench. Sloping can be used in conjunction with the trench shield, however where the top of the shield is below the excavation grade, it must extend a minimum of 18 inches above the vertical part of the wall (see Figure B-1.3 in Appendix B of the OSHA Standard). The excavated space between the face and the outside of the trench box will be as small as possible to prevent movement of the box.

The competent person on-site daily prior to work will inspect these trench box systems. All trench boxes must be installed and used in accordance with manufacturer's specific instructions and limitations using the manufacturer's tabulated data. *Recall that in our Department we will consider all soil Type C soil.*

No employee will be allowed in the trench box during installation, removal or relocation. Removal of the trench box will be done in conjunction with back filling.

Air Sampling

Whenever trenching/excavations deeper than 4 feet occur and there is reason to believe that a hazardous atmosphere may exist, then air sampling with the *(name of meter)* must be done prior to entry. The competent person will be responsible for determining the potential for hazardous atmospheres. Vapors, liquids and gases may travel through soil from sources such as nearby gas lines, underground chemical/gas/oil storage tanks or sewer lines. Hazardous atmospheres may also exist in soil that is nearby or in current or prior landfill areas. The *(name of meter)* is located *(where).*

(Person responsible) is responsible for calibration of this equipment in accordance with manufacturers recommendations. *(Give timeframes for calibration –usually at least monthly and annual factory calibration. Give location where calibration information will be kept or indicate that sticker will be placed on equipment to indicate most recent calibration date).*

Air monitoring will be done by the competent person who will record this data on the Daily Worksite Checklist. After initial monitoring, air monitoring will be repeated at the frequency specified by the competent person. The competent person may delegate responsibility for periodic testing to an on-site supervisor or employee only if that individual is trained in the use, maintenance, calibration, storage and limitations of the gas meter.

Employees will not be allowed to work in any space with less than 19.5% oxygen, more than 20%* of the Lower Explosive Limit (LEL) or in areas where the level of contaminant exceed of the toxic limits set on the confined space entry meter. If these levels are exceeded, the trench will not be entered until the area has been mechanically ventilated through the use of an explosion proof-blower or through natural ventilation. After ventilating the area, the atmosphere in the trench will be retested with the gas monitor to ensure that levels are acceptable prior to entry.

If levels continue to exceed acceptable limits, the work will stop until the source of the hazardous atmosphere has been determined and the Program Manager determines what course of action is needed. Such actions may include the determination and elimination of the source of the hazardous atmosphere and the use of self contained breathing apparatus by employees who are trained to use such devices.

**Note-the OSHA trenching standard allows up to 20% LEL, however most confined space entry meters are set to 10% of the LEL based on the OSHA Confined Space Entry Standard. The Department may wish to use 10% as the maximum level for flammable vapors in trenches as well.*

Excavations with Water Accumulation

Employees will not work in excavations in which there is accumulated water or in which water is accumulating unless adequate control measures are taken. These may include temporary shut off of water lines, water removal to control the level of accumulating water, diversion ditches, dikes, or other means to provide adequate drainage. The competent person must monitor any water removal equipment and operations. In addition, all open excavations must be reinspected after any rainfall or other extreme weather conditions by the competent person PRIOR to reentry by employees.

Surface Encumbrances in the Work Area

An encumbrance is anything that creates a load on the side of the open trench and could therefore cause it to cave in. This includes spoil piles, heavy equipment, vibration sources (including traffic), trees, utility poles, foundations, sidewalks, pipes or even the trench box itself. Surface encumbrances will be removed whenever possible or must be adequately supported as designed by the Registered Professional Engineer.

Superimposed Loads/Heavy Equipment

Superimposed Loads (crane, backhoe or other such equipment working close to excavation edges) also create additional load and will require extra shoring or other bracing to assure that the soil does not collapse. Vehicle barricades may need to be used to prevent heavy equipment from approaching too close to the work area. If mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of the excavation, and the operator does not have a clear view of the edge of the excavation, a warning system such as barricades, hand or mechanical signals, or stop logs must be used. If possible, the grade should be away from the excavation.

The competent person will determine the safe distance for the placement of heavy equipment and the vehicle safety zone. As a minimum, a safety zone of 1½ times the depth of the trench will be established unless the protective system used is rated for the loads imposed.

All equipment must be kept 10 ft away from overhead utility lines rated at 50kv. For lines rated over 50kv, keep 10 feet away plus 0.4 inches for every 1kv over 50. The competent person or on-site supervisor will assign an individual to observe clearance if it is necessary for heavy equipment to enter near a power line.

Workers who operate hoisting or other mechanical equipment used in excavations must be licensed by the Massachusetts Department of Public Safety in accordance with 520 CMR 6.00.

Exposure to Falling Loads

No employees will be allowed to walk or work underneath loads handled by lifting or digging equipment. Employees must stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials. Operators of vehicles being loaded or unloaded must remain in the cabs.

Stability of Adjacent Structures

Sidewalks, pavement, buildings, walls or other structures will never be undermined unless a support system or another method of protection is provided to prevent the collapse of such structures. A registered professional engineer must approve such a support system or must approve the work in order to ensure that any undermining will not pose a hazard to employees.

Access and Egress from Excavations

Ladders, stairs or walkable ramps must be located in all trenches/excavations more than four feet deep. Ladders must be placed so that no more than 25 feet of unobstructed lateral travel is required for egress. The competent person will make the determination on the number and placement of ladders needed on the site. All ladders must extend at least 3 feet above the trench opening.

Surface Crossing of Trenches/Fall Protection

In general, crossing over trenches will not be allowed. Where employees or equipment must cross over excavations, these walkways must have a minimum width of 20 inches as well as a standard railing. Note that standard railing requirements are provided in OSHA Standard 1926.502 (b). In general these railings have a top rail height of between 39-45 inches above the walking/working level with a midrail halfway between. Top railings must be capable of withstanding 200 pounds of downward and outward pressure while midrails must withstand 150 pounds of pressure. The walkways must extend a sufficient distance beyond each side of the trench wall to ensure stability. The competent person must approve the use of these walkways.

Training

Initial Training

Before being allowed to work at any trenching/excavation-site, all employees must be formally trained on the hazards of such work and measures that must be taken to prevent these hazards. In this department, training will be done by *(organization or individual providing training)*.

In addition, all employees will initially be trained in our Department's specific policies and procedures for trenching and excavation work. All employees will be provided with a copy of this policy and will be required to sign the policy to indicate that they have reviewed the policy and understand the contents.

Refresher Training

The Department will provide refresher training as the need arises. Retraining will also take place whenever there is a change in equipment, whenever there is a change in the Department's procedures and policies, and whenever there is an incident/near miss that indicates that there is a breakdown in the procedures.

In addition, whenever the competent person or on-site supervisor finds that a hazardous condition exists at the worksite or that an individual or group of employees is not following procedures, immediate onsite reminder/retraining will be done. If the competent person or on-site supervisor finds that this is an ongoing problem or that the employee(s) are routinely not following the required procedures, then disciplinary action may be taken in accordance with Departmental policy.

Daily Briefings

The competent person will provide a daily briefing to all employees on a trenching site if there are any unusual site specific hazards or safe work practices beyond those that are normally required for most trench/excavations.

Outside Contractors

All outside contractors will be expected to follow OSHA standards for trenching and excavation work. Any employee who observes a contractor who is not following these standards should report the condition to the on-site supervisor or competent person immediately.

Unattended Trenches

To prevent public or unauthorized entry, no trenches will be left unattended per Department of Public Safety regulations. At the end of the workshift, trenches are to be backfilled, plated or enclosed with a chain link fence unless they are constantly attended by an authorized employee.

Reporting of Accidents or Near Misses

Employees should report accidents and near misses, including any soil collapses, to the on-site supervisor or competent person. This individual will then report the situation to the next individual in the chain of command until the Program Manager is ultimately notified. The Program Manager will investigate and make changes as needed.

Review of Written Policy

This policy will be reviewed annually and revised as necessary. In addition, if a near miss or incident occurs, this policy will immediately be reviewed and revised if necessary.

Version/Revision #	
Date of Last Revision or Review	
Signature of Program Manager	

This model plan, based on OSHA Trenching standards, was developed by the Massachusetts Division of Occupational Safety's (DOS) Occupational Hygiene/Indoor Air Quality Program. The program was designed to incorporate OSHA standards as a minimum but goes beyond the requirements of the standard to include safe work practices and policies designed to further protect workers. The plan was primarily designed for municipal public works departments, but may apply to other trenching/excavation operations as well. In accordance with MGL Chapter 149 Section 6 and DOS policy, all municipalities are expected to comply with OSHA Standards.

Trenching/Excavation Policy and Procedures

I have read the Department's Trenching/Excavation policy and have been trained on the procedures to follow in order to safely work on an excavation-site. I understand that I am held accountable for following these procedures and for notifying the on site supervisor or competent person if I feel an unsafe condition exists for me or my coworkers. I understand that a copy of these procedures will be available at each trench site for my review along with the Daily Inspection Checklist that will indicate safety procedures that are to be used for each trench site.

Signature _____ Date _____